

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/01448

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : C12N 9/52, 9/54, 9/56, 15/57, 15/74, 15/75; C11D 3/386 US CL : 435/220, 221, 222, 252.3, 320.1; 510/392; 536/23.2 According to International Patent Classification (IPC) or to both national classification and IPC																				
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 435/220, 221, 222, 252.3, 320.1; 536/23.2 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Please See Continuation Sheet																				
C. DOCUMENTS CONSIDERED TO BE RELEVANT																				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																		
X --- Y	WO 99/20723 A2 (THE PROCTER & GAMBLE COMPANY) 29 April 1999 (29.04.1999). see pages 4, 12, 25, 16, 19, 20, 26-31, 37-39, 48, 50, 52-54, 57, 59, 61, 66, 67, 73, 74, 77-93, and 100-136, and claims 1, 2, and 6-22.	1-3 and 7-10 ----- 5																		
X --- Y	US 6,312,936 B1 (POULOSE et al) 06 November 2001 (06.11.2001), see columns 1-36 and claims 1-3 and 21-26.	1-4 and 7-10 ----- 5																		
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.																				
<table border="0"><tr><td>* Special categories of cited documents:</td><td>"T"</td><td>Inter document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td></tr><tr><td>"A" document defining the general state of the art which is not considered to be of particular relevance</td><td>"X"</td><td>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td></tr><tr><td>"E" earlier application or patent published on or after the international filing date</td><td>"Y"</td><td>document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td></tr><tr><td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td><td>"&"</td><td>document member of the same patent family</td></tr><tr><td>"O" document referring to an oral disclosure, use, exhibition or other means</td><td></td><td></td></tr><tr><td>"P" document published prior to the international filing date but later than the priority date claimed</td><td></td><td></td></tr></table>			* Special categories of cited documents:	"T"	Inter document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"E" earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family	"O" document referring to an oral disclosure, use, exhibition or other means			"P" document published prior to the international filing date but later than the priority date claimed		
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"O" document referring to an oral disclosure, use, exhibition or other means																				
"P" document published prior to the international filing date but later than the priority date claimed																				
Date of the actual completion of the international search 21 November 2004 (21.11.2004)		Date of mailing of the international search report 06 JAN 2005																		
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer <i>Maria J. Waters</i> Ponnathapura Achutamurthy Telephone No. (571) 272-0928																		

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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: Please See Continuation Sheet

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

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BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In order for more than one species to be examined, the appropriate additional examination fees must be paid. The species are as follows: Protease variants having a secondary amino acid substitution in at least one position corresponding to any of the subtilisin BPN' positions 1, 14, 49, 61, 87, 100, 102, 118, 128, 204, and 258. The claims are deemed to correspond to the species listed above in the following manner: Claims 5 and 6 describe at least 11 distinct species. The following claim(s) are generic: Claims 5 and 6.

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: Proteases comprising one or more primary amino acid substitutions described by claims 1-4 and 7-10 are known in the art, thus provide no special technical feature, and the disclosure describes no special technical feature shared by two or more proteases having any of the further, secondary, amino acid substitutions of the species designated in claims 5 and 6, thus the species listed above do not relate to any single inventive concept.

Continuation of Box II Item 4:

1-10 to the extent they describe a variant protease having a second amino acid substitution at a position corresponding to the subtilisin BPN' position 1 wherein the combination of a substitution at this position with a first amino acid substitution at a subtilisin BPN'-correspondent position selected from the group of positions consisting of 27, 45, 170, 181, 251 and 271 results in the same net electrostatic charge exhibited by the precursor protease.

Continuation of B. FIELDS SEARCHED Item 3:

Textual search in WEST databases US Patents & US Pre-Grant Publications, EPO Abstracts, JPO Abstracts, and Derwent World Patents Index